



[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2012-0002; Directorate Identifier 2011-NE-42-AD]

RIN 2120-AA64

Airworthiness Directives; Continental Motors, Inc. Reciprocating Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Supplemental notice of proposed rulemaking (NPRM); reopening of comment period.

SUMMARY: We are revising an earlier proposed airworthiness directive (AD) for certain Airmotive Engineering Corp. (AEC) replacement parts manufacturer approval (PMA) cylinder assemblies marketed by Engine Components International Division (ECi). We subsequently issued an initial supplemental NPRM (SNPRM) that proposed to modify the schedule for removal of the affected cylinder assemblies, added that overhauled affected cylinder assemblies be removed within 80 hours, eliminated a reporting requirement, and removed a requirement for initial and repetitive inspections. This second SNPRM reopens the comment period to allow the public the chance to comment on additional information added to the docket of this proposed rule. We are proposing this SNPRM to prevent failure of the cylinder assemblies, which could lead to failure of the engine, in-flight shutdown, and loss of control of the airplane.

DATES: We must receive comments on this SNPRM by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this proposed AD, contact Engine Components International Division, 9503 Middlex Drive, San Antonio, TX 78217; phone: 210-820-8101; Internet: http://www.eci.aero/pages/tech_svcpubs.aspx. You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2012-0002; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Office (phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Jurgen E. Priester, Aerospace Engineer, Delegation Systems Certification Office, FAA, Rotorcraft Directorate, 2601

Meacham Blvd., Fort Worth, TX 76137; phone: 817-222-5190; fax: 817-222-5785;
email: jurgen.e.priester@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite you to send any written relevant data, views, or arguments about this proposed AD. Send your comments to an address listed under the ADDRESSES section. Include “Docket No. FAA-2012-0002; Directorate Identifier 2011-NE-42-AD” at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed AD because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.

Discussion

We issued an NPRM to amend 14 CFR part 39 by adding an AD that would apply to certain AEC replacement PMA cylinder assemblies marketed by ECI. These assemblies are used on Continental Motors, Inc. (CMI) model 520 and 550 reciprocating engines, and all other CMI engine models approved for the use of models 520 and 550 cylinder assemblies such as the CMI model 470 when modified by STC. The NPRM published in the Federal Register on August 12, 2013 (78 FR 48828). The NPRM proposed to require initial and repetitive inspections, immediate replacement of cracked cylinder assemblies, and replacement of cylinder assemblies at reduced times-in-service (TIS) since new. The NPRM also proposed to prohibit the installation of affected cylinder assemblies into any engine.

We subsequently issued an SNPRM which published in the Federal Register on January 8, 2015 (80 FR 1008). The SNPRM proposed a modified schedule for removal of the affected cylinder assemblies, added that overhauled affected cylinder assemblies be removed within 80 hours, eliminated a reporting requirement, and removed the requirement for initial and repetitive inspections.

Actions Since Previous SNPRM was Issued

Since we issued the SNPRM (80 FR 1008, January 8, 2015), we received numerous additional comments on the proposed rule. After reviewing the comments, we decided to reopen the docket so that we could provide additional information to explain the rationale for this AD action. We also wanted to provide commenters with the opportunity to comment on this additional information. We added the following information to Docket No. FAA-2012-0002: (1) the risk analysis conducted by the FAA's Chief Scientific and Technical Adviser, Aircraft Safety Analysis; (2) a risk analysis using the Small Airplane Risk Analysis methods; (3) a June 2011, presentation by Airmotive Engineering to the FAA concerning its ECi cylinder assemblies; (4) a list of ECi cylinder assembly failure reports consisting of only those reports where both cylinder serial number and Time in Service are included in the reports; (5) a list of additional failures of ECi cylinder assemblies reported by a maintenance organization; (6) copies of the slides discussed with the NTSB on June 9, 2015 during the meeting with the NTSB to understand its comments to 2011-NE-42-AD, and (7) Airmotive Engineering Corporation Technical Report 1102-13, dated April 30, 2011.

In addition, we met with National Transportation Safety Board (NTSB) representatives on June 9, 2015, to clarify the NTSB's basis for its comments of FAA's actions in this proposed rule.

We are taking this opportunity to respond to a limited number of comments. Specifically, we found that numerous commenters cited differences between the FAA's

proposed action and the NTSB's recommendations in NTSB Safety Recommendation A-12-7. We will respond to remaining comments to the initial SNPRM (80 FR 1008, January 8, 2015) and to this second SNPRM when we issue the final rule.

Comments to the Previous SNPRM

Request to Provide Supporting Information

Danbury Aerospace, Inc., and others in their comments to the SNPRM (80 FR 1008, January 8, 2015), requested that we provide additional information that supports this AD action.

We agree. We added our risk analyses and other technical information, such as the list of cylinder failures noted above and ECI Technical Report 1102-13 that supports this proposed rule, to Docket No. FAA-2012-0002 to help commenters and the general public understand the need for this proposed rule.

Request to Withdraw the SNPRM Because ECI Cylinder Assemblies Are not Unsafe

Several operators, maintenance organizations, and private citizens asked that we withdraw the SNPRM (80 FR 1008, January 8, 2015) because the affected ECI cylinder assemblies have an equivalent, or lower, failure rate than that of cylinder assemblies manufactured by the original equipment manufacturer (OEM).

We disagree. We found that the failure rate for ECI cylinder assemblies is much higher than for OEM cylinder assemblies over the same period. Accident data confirms, that engines and airplanes may not always continue to operate safely with a separated cylinder and that separated cylinders have been the precipitating event in at least two fatal accidents. This accident data is included in the risk analyses that we uploaded to the docket (see NTSB Accident Identifiers NYC02FA178 and ERA11WA008, which are cited in these analyses). We did not withdraw this proposed rule.

Request to Review Comparison of Failure Rate Between OEM and ECi Cylinder Assemblies

The NTSB commented that the comparison between failure rates of OEM and ECi cylinder assemblies was not valid because the cylinder heads represented substantially different designs.

We disagree that the comparison between OEM and ECi cylinder assemblies is not valid. The ECi PMA design was reverse engineered by ECi from earlier vintage OEM cylinders, and uses the same time between overhaul (TBO) as the OEM cylinders. Since these ECi cylinder assemblies are approved to the same TBO as the OEM cylinders, the ECi cylinders should have durability that is equivalent to the OEM cylinders. Our comparison of ECi cylinder assembly service history with the OEM cylinder assembly history showed that the rate of separation for the affected ECi cylinder assemblies is at least 32 times greater than that of OEM cylinder assemblies over the same period. We uploaded this data for commenter review. It may be viewed in Docket No. FAA-2012-0002. We did not change this proposed AD.

Request to Revise Applicability

The NTSB commented that it has not investigated any cases involving engines with cylinder assemblies ranging from serial number (S/N) 1 through S/N 1043. The NTSB indicated that cylinder assemblies in this S/N range should not be affected by the AD.

We disagree. Cylinder assemblies with S/N 1 through S/N 1043 have the same design as noted in this SNPRM, exhibit the same unsafe condition, and therefore must be included in the applicability. We did not change this proposed AD.

The NTSB also commented that AD 2004-08-10, which was issued on May 5, 2004, requires replacement before further flight of ECi cylinder assemblies ranging from S/N 1044 through S/N 7708 installed on CMI 520 and 550 series engines. According to AD 2004-08-10, ECi identified a manufacturing discrepancy that occurred between

September 2002 and May 2003 affecting cylinder assemblies S/N 1044 through S/N 7708, which resulted in an over-hardened condition that would reduce the fatigue strength of the aluminum cylinder head. The NTSB commented, therefore, that cylinder assemblies S/N 1044 through S/N 7708 should not be included in the proposed AD.

We disagree. AD 2004-08-10 does not apply to all cylinder assemblies S/N 1044 through S/N 7708; it applies only to cylinder assemblies having specific cast markings. Cylinder assemblies S/N 1004 through S/N 7708 have the same design as noted in this SNPRM, exhibit the same unsafe condition, and therefore must be included in the applicability. We did not change this proposed AD.

The NTSB also commented that, based on its review of the additional seal band interference fit data provided by ECI, action is only required for 165 cylinder assemblies S/N 36210 through S/N 61176.

We disagree. We have received reports of separations of cylinder assemblies S/N 36210 through S/N 61176 that were not among the 165 cylinders that ECI claimed may be at risk for separation due to insufficient head to barrel interference fit. We have uploaded information in Docket No. FAA-2012-0002 that identifies S/Ns of failed cylinder assemblies that were not among the 165 cylinder assemblies identified by ECI. We did not change this proposed AD.

The NTSB commented that the applicability represented by the SNPRM—S/N 1 through S/N 61176—represents a much larger number of affected cylinder assemblies than is supported by its investigations.

We disagree. ECI's next increase in the design interference fit was incorporated beginning with S/N 61177. Consequently, all cylinder assemblies S/N 1 through S/N 61176 are at risk for separation in the first thread due to insufficient interference fit. We, therefore, find that based on service failure data, identified in the docket as "U.S. DOT/FAA – 04 ECI 520-550 Cylinder Separations," and ECI's implementation of design

improvements, this proposed AD must apply to cylinder assemblies S/N 1 through S/N 61176. We did not change this proposed AD.

Request to Include Repetitive Inspection Requirement

The NTSB commented that we should impose a repetitive inspection requirement for certain ECi cylinder assemblies and their removal once they reach the manufacturer's recommended TBO. This repetitive inspection requirement was part of the NPRM (78 FR 48828, August 12, 2013), but we removed it from the SNPRM (80 FR 1008, January 8, 2015).

The NTSB observed that the FAA had published Special Airworthiness Information Bulletin (SAIB) NE-07-09R1, dated March 21, 2007, and approved ECi Mandatory Service Bulletin 06-2, Revision 2, dated October 26, 2006. Both of these documents emphasize the importance of conducting periodic inspections of ECi cylinder assemblies.

We disagree. We have found, based on service experience since the publication of SAIB NE-07-09R1, that the inspection and tests are not reliable in detecting cracked cylinders and the cost associated with such ongoing tests outweighs the safety benefit. In addition, the crack propagation growth rate is unknown. As a result, we have received field reports of separated cylinders that occurred within the repetitive 50-hour compression test and leak check inspection intervals proposed by the NPRM. We did not change this proposed AD.

The NTSB also noted that repetitive inspections are not perfect but are still effective in detecting cracks that have propagated through the cylinder wall. These inspections provide an added level of safety from the time of the issuance of the final rule AD until the required removal of the cylinder assembly.

We disagree. We find that repetitive inspections until TBO are inconsistent with the serious hazard represented by cylinder assembly failures. See the "U.S. DOT/FAA –

01 Risk Analysis White Paper” for 2011-NE-42-AD that we uploaded to the AD docket on June 23, 2015. Therefore, we are requiring removal of affected cylinder assemblies from service prior to TBO. We did not change this proposed AD.

FAA’s Determination

We are proposing this SNPRM to allow the public the opportunity to comment on additional information we added to the docket of this proposed rule.

Proposed Requirements of this SNPRM

As proposed in the first SNPRM published on January 8, 2015 (80 FR 1008), this second SNPRM would require removal of the affected cylinder assemblies, including overhauled cylinder assemblies, according to a phased removal schedule.

Costs of Compliance

We estimate that this proposed AD would affect about 5,000 CMI models IO-520, TSIO-520, IO-550, and IOF-550 reciprocating engines and all other CMI engine models approved for the use of CMI models 520 and 550 cylinder assemblies (such as the CMI model 470 when modified by STC), installed on airplanes of U.S. registry. The average labor rate is \$85 per hour. We estimate that about 18 hours would be required to replace all six cylinder assemblies during overhaul maintenance. We estimate the pro-rated value of the cost of replacement of six cylinder assemblies to be about \$4,202 per engine. Based on these figures, we estimate the total cost of this proposed AD to U.S. operators to change all ECi cylinder assemblies to be \$28,660,000. Our cost estimate is exclusive of possible warranty coverage.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA’s authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. “Subtitle VII: Aviation Programs” describes in more detail the scope of the Agency’s authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: “General requirements.” Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

We determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska to the extent that it justifies making a regulatory distinction, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

Continental Motors, Inc. (formerly Teledyne Continental Motors, Inc., formerly Continental): Docket No. FAA-2012-0002; Directorate Identifier 2011-NE-42-AD.

(a) Comments Due Date

We must receive comments by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to all Continental Motors, Inc. (CMI) model 520 and 550 reciprocating engines, and to all other CMI engine models approved for the use of model 520 and 550 cylinder assemblies such as the CMI model 470 when modified by supplemental type certificate (STC), with Airmotive Engineering Corp. replacement parts manufacturer approval (PMA) cylinder assemblies, marketed by Engine Components International Division (hereinafter referred to as ECi), part number (P/N) AEC631397, with ECi Class 71 or Class 76, serial number (S/N) 1 through S/N 61176, installed.

(d) Unsafe Condition

This AD was prompted by multiple failure reports of cylinder head-to-barrel separations and cracked and leaking aluminum cylinder heads. We are issuing this AD to prevent failure of the cylinder assemblies, which could lead to failure of the engine, in-flight shutdown, and loss of control of the airplane.

(e) Compliance

Comply with this AD within the compliance times specified, unless already done.

(1) Review the engine maintenance records to determine if any affected cylinder assemblies are installed.

(2) If you cannot determine based on review of engine maintenance records if any affected cylinder assemblies are installed, comply with paragraph (e)(4) of this AD.

(3) If you do not have any of the affected ECi cylinder assemblies installed on your engine, no further action is required.

(4) Cylinder Identification and Serial Number Location

(i) Check the cylinder assembly P/N and Class number. The ECi cylinder assembly, P/N AEC631397, Class 71 or Class 76, is stamped on the bottom flange of the cylinder barrel. Guidance on the P/N and Class number description and location can be found in ECi Service Instruction No. 99-8-1, Revision 9, dated February 23, 2009.

(ii) If you cannot see the cylinder assembly P/N when the cylinder assembly is installed on the engine, you may use the following alternative method of identification:

(A) Remove the cylinder assembly rocker box cover.

(B) Find the letters ECi, cast into the cylinder head between the valve stems.

(C) Check the cylinder head casting P/N. Affected cylinder assemblies have the cylinder head casting P/N, AEC65385, cast into the cylinder head between the valve stems.

(D) Find the cylinder assembly S/N as specified in paragraph (e)(4)(iii) or (e)(4)(iv) of this AD, as applicable.

(iii) For ECi cylinder assemblies, P/N AEC631397, manufactured through 2008, find the cylinder assembly S/N stamped on the intake port boss two inches down from the top edge of the head.

(iv) For ECI cylinder assemblies, P/N AEC631397, manufactured on or after January 1, 2009, find the cylinder assembly S/N stamped just below the top edge of the head on the exhaust port side.

(5) Removal From Service

(i) For any affected cylinder assembly with 680 or fewer operating hours time-in-service (TIS) since new on the effective date of this AD, remove the cylinder assembly from service before reaching 1,000 operating hours TIS since new.

(ii) For any affected cylinder assembly with more than 680 operating hours TIS since new and 1,000 or fewer operating hours TIS since new on the effective date of this AD, remove the cylinder assembly from service within the next 320 operating hours TIS or within 1,160 operating hours TIS since new, whichever occurs first.

(iii) For any affected cylinder assembly with more than 1,000 operating hours TIS since new on the effective date of this AD, remove the cylinder assembly from service within the next 160 operating hours or at next engine overhaul, whichever occurs first.

(iv) For any affected cylinder assembly that has been overhauled, remove the cylinder assembly from service within the next 80 operating hours TIS after the effective date of this AD.

(f) Installation Prohibitions

After the effective date of this AD:

(1) Do not repair, or reinstall onto any engine, any cylinder assembly removed per this AD.

(2) Do not install any affected ECI cylinder assembly that has been overhauled, into any engine.

(3) Do not install any engine that has one or more affected overhauled ECI cylinder assemblies, onto any aircraft.

(4) Do not return to service any aircraft that has an engine installed with an ECI cylinder assembly subject to this AD, if the cylinder assembly has 1,000 or more operating hours TIS.

(g) Alternative Methods of Compliance (AMOCs)

The Manager, Delegation Systems Certification Office, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request.

(h) Related Information

(1) For more information about this AD, contact Jurgen E. Priester, Aerospace Engineer, Delegation Systems Certification Office, FAA, Rotorcraft Directorate, 2601 Meacham Blvd., Fort Worth, TX 76193; phone: 817-222-5190; fax: 817-222-5785; email: jurgen.e.priester@faa.gov.

(2) For ECI Service Instruction No. 99-8-1, Revision 9, dated February 23, 2009, contact Engine Components International Division, 9503 Middlex Drive, San Antonio, TX 78217; phone: 210-820-8101; Internet: http://www.eci.aero/pages/tech_svcpubs.aspx.

(3) You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Issued in Burlington, Massachusetts, on August 10, 2015.

Colleen M. D'Alessandro,
Directorate Manager, Engine & Propeller Directorate,
Aircraft Certification Service.
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